Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

Expanding Flexible Use of the 3.7 to 4.2 GHz Band	)	GN Docket No. 18-122
Expanding Flexible Use in Mid-Band Spectrum Between 3.7 and 24 GHz	)	GN Docket No. 17-183 (Inquiry Terminated as to 3.7-4.2 GHz)
Petition for Rulemaking to Amend and Modernize Parts 25 and 101 of the Commission's Rules to Authorize and Facilitate the Deployment of Licensed Point-to-Multipoint Fixed Wireless Broadband Service in the 3.7-4.2 GHz Band	)	RM-11791
Fixed Wireless Communications Coalition, Inc., Request for Modified Coordination Procedures in Bands Shared Between the Fixed Service and the Fixed Satellite Service	)	RM-11778

REPLY COMMENTS OF U.S. ELECTRODYNAMICS, INC.

U.S. Electrodynamics, Inc. ("USEI") hereby submits these reply comments ("Comments") in response to the above-captioned Notice of Proposed Rulemaking ("Notice").[1]

The Notice provides the Federal Communications Commission ("FCC" or "Commission") with the unprecedented opportunity to repurpose valuable mid-band 3.7 – 4.2 GHz spectrum ("C-band Downlink") in order to meet the consumer demand of the next generation of terrestrial mobile networks. At the same time, and in order to facilitate this, the FCC must protect the Fixed Satellite Service ("FSS") incumbent operations already in this band such that they can continue to economically and efficiently meet their critical business, national

[1] *See Expanding Flexible Use of the 3.7-4.2 GHz Band,* Order and Notice of Proposed Rulemaking, GN Docket No. 18-122, FCC 18-91, ¶¶ 66-97 (rel. July 13, 2018) ("NPRM").

security, public safety and emergency demands, which currently are relied on by millions of FSS customers in the United States.

USEI submits that it is imperative the Commission treat both of these goals as co-equal, and that, in the rush to meet 5G needs expeditiously and economically, it not sacrifice the FSS spectrum and operational requirements.

USEI is an aerospace and communications company founded in 1985.[2] It is the owner and operator of the Pacific Ocean Region Brewster Teleport in Brewster, Washington and the Atlantic Ocean Region Vernon Valley Teleport in New Jersey. Both FSS Teleports contain C-band antennas dedicated to "Mission Critical" and "Life and Safety" services. Both facilities and services could be impacted by the Commission's Notice. USEI is also one of the largest "independent" earth station operators; it does not operate any satellites. As such, USEI is a party of interest with significant views of interest to this issue.

In support of these Comments, USEI submits as follows:

First, USEI supports the comments of the C-Band Alliance that alternative spectrum bands and technologies are not adequate substitutes for the C-band for FSS. USEI agrees with the C-Band Alliance that "other technologies do not match the C-band['s] reliability, coverage, and cost-effectiveness."[3] By way of example, the next higher available frequency, Ku-band, has atmospheric loss of signal approximately 100-1,000 times more threatening than C-band at ground stations. The lack of viable substitutes reinforces the importance of preserving the C-band content delivery ecosystem.

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[2] USEI is the aerospace unit of the licensed FSS operator, Denali20020, LLC.

[3] Comments of the C-Band Alliance at 15.

Second, USEI agrees with SIA that allowing P2MP would "fundamentally disrupt the FSS ecosystem, keep customers from extracting the full benefits of their contractual agreements, and prevent efficient management of the spectrum used for C-band FSS."[4] P2MP "transmissions necessarily emit high-powered signals in many directions, which greatly increases the difficulty of frequency coordination and the potential for harmful interference to existing C-band usage."[5] Doing so "would cause substantial harm to FSS usage of the C-band and endanger the reliability of content delivery across the country." As such, co-frequency sharing between FSS and terrestrial mobile operations is infeasible, particularly as related to "Mission Critical" services.

Third, the C-Band Alliance has submitted a "Market-Based Approach" to freeing up spectrum in the C-band Downlink for mobile networks and for safeguarding C-band FSS Services.[6] The C-Band Alliance states that "under the Market-Based Approach, market forces will ensure that spectrum is converted to 5G mobile use efficiently while satellite operators receive appropriate compensation for their investment, future losses, and clearing costs, and that satellite operator's earth station customers remain fully protected."[7] They also state that "the C-Band Alliance has made a public commitment to protect C-band users throughout the transition to ensure that C-band FSS services continue to provide the quality, reliability, and certainty that C-band users need to operate and to grow their business".[8] Satellite operators (earth station and space station) and their users have invested millions of dollars in ground infrastructure to support Mission Critical and Safety services. USEI supports the "Market-Based Approach" as it commits

4 Comments of the Satellite Industry Association at 29.
5 Comments of the Content Companies, at 11.
6 Comments of the C-Band Alliance at 17.
7 *Id.* at 3.
8 *Id*.

to this approach. To the best of our understanding at this juncture, no other approach makes such a commitment.

Fourth, we understand that the "Market-based Approach," as committed to by the C-Band Alliance, will compensate the earth station operators for opportunity costs, as well as for the costs of clearing spectrum (such as filters), thus ensuring a vigorous, technically innovative and competitive service in the future. While the procedures for determining repacking, replacement and opportunity costs remain uncertain, the commitment is certain. USEI supports this commitment.

Fifth, protecting C-band FSS reception of satellite signals from co-frequency terrestrial interference has proven infeasible, particularly in areas highly prone to interference. This can be seen in the 3.5-3.65 GHz band with large "Protection Zones" around earth stations. While USEI supports efforts to mitigate interference on a national level, thus not to constrain terrestrial operations, it should be recognized that this will not always be possible without mandatory, well-defined protections, even with a "Market-Based Approach." This would appear to be particularly possible and feasible in rural areas. The Commission must not abdicate its regulatory responsibility here and rush to a commercial solution. Some regulation will be necessary.

USEI believes that many commercial, technical, financial and operational details regarding the C- Band Alliance Market-Based Mitigation Plan need to be revealed and clearly communicated to stake-holders before any decision can be made. USEI is committed to working with the C-Band Alliance to define and evaluate these details. We recognize that the C-Band Alliance has developed a customer program for this that will be discussed with the community of

independent earth station operators going forward.[9] USEI reserves the opportunity to comment on this program as it matures.

In conclusion, USEI supports the efforts of the C-Band Alliance to develop a Market-Based Approach to C-band realignment.

Respectfully submitted,

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[9] *Id* at 20.